

What is Claimed is:

1. Bioreactor for cultivating mammalian cells within a porous support matrix within a cultivation medium, comprising an inner vessel (4) arrangeable within an outer vessel (1), said inner vessel (4) having a smaller inner diameter at its closed bottom portion and a larger inner diameter at its opposite open top portion, and a lid (8) sealingly covering the top portion of said inner vessel (4), said lid (8) sealingly accommodating penetrating probes, pipes, and supply ducts,  
characterized by  
a matrix carrier (17) arranged in fluid proof connection at a first end of a carrier pipe (11), the opposite second end of said carrier pipe (11) sealingly penetrating said lid (8),  
the matrix carrier (17) having an inlet boring (19) at its first end open to the volume of said inner vessel (4) and an outlet boring (18) at its second end opposite its first end, the second end connected in fluid proof connection to the first end of said carrier pipe (11),  
the interior volume (20) of said matrix carrier (17) essentially shaped to accommodate faces of a support matrix at least on a circumferential line thereof by positive fit for ingrowth of mammalian cells while allowing medium to enter said interior volume (20) via inlet boring (19) and leave via outlet boring (18), and  
a return pipe (12) being in fluid proof connection with said carrier pipe (11) for circulating at least part of the cultivation medium.
2. Bioreactor according to claim 1, characterized in that said return pipe (12) is connected to said carrier pipe (11) via a circulating duct (15), to which a circulation pump (16) is attached for pumping medium through matrix carrier (17) and carrier pipe (11) back into inner vessel (4) via return pipe (12).
3. Bioreactor according to claim 1, characterized by a feed line (30) for delivering medium from a medium supply vessel (33) into inner vessel (4) and a drain line (32) for removing medium from inner vessel (4).
4. Bioreactor according to claim 1, characterized by a feed line (30) connected to the circulation duct (15) for feeding medium therein and a drain line (32) branching off the circulation duct (15) for removing medium therefrom.

5. Bioreactor according to claim 3 or 4, characterized by a level control probe to monitor the level of medium inside inner vessel (4) and regulate the flow of medium in said feed line (30) and said drain line (32).

6. Use of a bioreactor according to claim 1 for cultivating osteoblastic cells within the body of a porous support matrix.